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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
LEE, EDMUND H	
ART UNIT	**PAPER NUMBER**
1732	

DATE MAILED: 12/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/668,291	DEBALME ET AL.	
	Examiner	Art Unit	
	EDMUND H. LEE	1732	

-- The MAILING DATE of this communication appears on th cover sheet with th correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 September 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6,20-23 and 25-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6,20-23 and 25-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1,2, 6, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loubinoux et al (USPN 6294036) in view of Angell, Jr. et al (USPN 5037284) and Kuts (USPN 2954815). In regard to claim 1, Loubinoux et al teach the basic claimed process including a process for manufacturing a composite tape based on reinforced fibers and thermoplastic organic material (col 2, ln 10-col 3, ln 40; figs 1-6); entraining yarns based on thermoplastic and reinforcing fibers and bring together the yarns in a parallel and touching manner in the form of a sheet (col 2, ln 10-col 3, ln 40; figs 1-6); heating the sheet in a heating zone wherein the sheet is heated to a temperature reaching at least the melting point of the thermoplastic without reaching the softening temperature of the reinforcing fibers (col 2, lns 10-col 3, ln 40; figs 1-6); introducing the sheet against at least one rotating bar that shapes and centers the touching yarns of the sheet wherein the sheet is maintained at a temperature at which the thermoplastic is malleable and the touching yarns are brought together into a more touching state (col 2, lns 63-66; col 3, ln 66-col 4, ln 28)--as a note, the elimination of the corrugations indicate that the touching yarns were moved into a more touching state; and cooling the sheet in order to consolidate the yarns by freezing the thermoplastic and set the dimension and appearance of the sheet (col 5, ln 52-col 6, ln

10; figs 1-6). However, Loubinoux et al does not teach a rotating impregnation device including heated rollers that maintains the temperature of the sheet at a temperature at which the thermoplastic is malleable and distributes the thermoplastic uniformly and impregnates the fibers; a shaping and centering device including a roller in a shape of a hyperboloid. In regard to a rotating impregnation device, Angell, Jr. et al teach a process for manufacturing resin-impregnated fiber tows (figs 1-2); using an impregnation station including kneader rolls and nip rolls positioned before a centering roll wherein the kneader and nip rolls cause uniform distribution of the resin and uniform impregnation of the fibers (col 4, lns 18-50; figs 1-2); and heating the kneader rolls and nip rolls to maintain the resin in a molten condition (col 4, lns 42-48; figs 1-6). Angell, Jr. et al also teach maintaining the resin portion of the impregnated tow in a molten condition by applying external heating through radiant heaters or heated air, and enclosing the coating area inclusive of the kneader rolls, nip rolls, and coating rolls in order to maintain an elevated temperature environment (col 4, lns 42-48)--as a note, these teachings constitute using a rotating impregnation device including heated rollers. Loubinoux et al and Angell, Jr. et al are combinable because they are analogous with respect to forming a fiber-reinforced tape/sheet/tow. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to redesign the apparatus of Loubinoux et al to include the heated kneader rolls and nip rolls of Angell, Jr. et al between the heating zone and at least one rotating bar of Loubinoux et al in order to produce a fiber-reinforced sheet having greater strength and uniformity. In regard to a shaping and centering device including a roller in a shape of a hyperboloid,

Loubinoux et al teach using a bar for centering having a varying cross-section and curved (col 4, lns 34-50). Kuts teaches a method of forming a ribbons from rubber threads (figs 1-3); and using a concave or hour glass roll 52 to gather threads, i.e., to crowd/bring together threads (col 4, lns 60-67; figs 7 and 11). Loubinoux et al and Kuts are combinable because they analogous with respect to using a roll/bar to center threads/yarns. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the concave or hour glass roller of Kuts for the bar of Loubinoux et al in order to ensure accurate gathering of the yarns of Loubinoux et al. Loubinoux et al also teach passing the sheet through a heating zone before a cooling zone (col 9, ln 39-46; fig 6)--as a note, this constitutes the claimed step of passing the sheet through a heating zone after the sheet has passed through the rotating impregnating device. In regard to claims 2 and 6, Loubinoux et al teach providing yarns consisting of continuous glass filaments and continuous thermoplastic filaments which are co-mingled (col 2, ln 10-col 3, ln 40); and winding the fiber-reinforced sheet on a mandrel (col 5, lns 30-33). In regard to claims 29, Loubinoux et al do not teach cooling by immersing in a water bath. The use of a water bath as a cooling means is a mere obvious matter of choice dependent on the equipment availability and of little patentable consequence to the claimed process since it is not a manipulative feature or step of the claimed process. Further, water baths as cooling means are well-known in the molding art. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a water bath in the process of Loubinoux et al in order to cool the tape of Loubinoux et al in an efficient manner. In

regard to claim 30, such is well-known in the molding art in order to control tape/sheet thickness. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to drive the heated rollers of Loubinoux et al at a lower speed of rotation than a speed at which the sheet is traveling in order to control the thickness of the tape/sheet of Loubinoux et al.

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Loubinoux et al (USPN 6294036) in view of Angell, Jr. et al (USPN 5037284) and Kuts (USPN 2954815). Loubinoux et al teach the basic claimed process including a process for manufacturing a composite tape based on reinforced fibers and thermoplastic organic material (col 2, ln 10-col 3, ln 40; figs 1-6); entraining yarns based on thermoplastic and reinforcing fibers and bring together the yarns in a parallel and touching manner in the form of a sheet (col 2, ln 10-col 3, ln 40; figs 1-6); heating the sheet in a heating zone wherein the sheet is heated to a temperature reaching at least the melting point of the thermoplastic without reaching the softening temperature of the reinforcing fibers (col 2, lns 10-col 3, ln 40; figs 1-6); introducing the sheet against at least one rotating bar that shapes and centers the touching yarns of the sheet wherein the sheet is maintained at a temperature at which the thermoplastic is malleable and the touching yarns are brought together into a more touching state (col 2, lns 63-66; col 3, ln 66-col 4, ln 28)--as a note, the elimination of the corrugations indicate that the touching yarns were moved into a more touching state; and cooling the sheet in order to consolidate the yarns by freezing the thermoplastic and set the dimension and

appearance of the sheet (col 5, ln 52-col 6, ln 10; figs 1-6). Loubinoux et al also teach unreeling a continuous yarn of reinforcing filaments and thermoplastic filaments and regulating the tension of the yarns (col 2, ln 10-col 3, ln 40; col 8, lns 50-60; figs 1-6). However, Loubinoux et al does not teach a rotating impregnation device including heated rollers that maintains the temperature of the sheet at a temperature at which the thermoplastic is malleable and distributes the thermoplastic uniformly and impregnates the fibers; a shaping and centering device including a roller in a shape of a hyperboloid; and using heated rollers having heating elements therein. In regard to a rotating impregnation device, Angell, Jr. et al teach a process for manufacturing resin-impregnated fiber tows (figs 1-2); using an impregnation station including kneader rolls and nip rolls positioned before a centering roll wherein the kneader and nip rolls cause uniform distribution of the resin and uniform impregnation of the fibers (col 4, lns 18-50; figs 1-2); and heating the kneader rolls and nip rolls to maintain the resin in a molten condition (col 4, lns 42-48; figs 1-6). Angell, Jr. et al also teach maintaining the resin portion of the impregnated tow in a molten condition by applying external heating through radiant heaters or heated air, and enclosing the coating area inclusive of the kneader rolls, nip rolls, and coating rolls in order to maintain an elevated temperature environment (col 4, lns 42-48)--as a note, these teachings constitute using a rotating impregnation device including heated rollers. Loubinoux et al and Angell, Jr. et al are combinable because they are analogous with respect to forming a fiber-reinforced tape/sheet/tow. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to redesign the apparatus of Loubinoux et al to include

the heated kneader rolls and nip rolls of Angell, Jr. et al between the heating zone and at least one rotating bar of Loubinoux et al in order to produce a fiber-reinforced sheet having greater strength and uniformity. In regard to a shaping and centering device including a roller in a shape of a hyperboloid, Loubinoux et al teach using a bar for centering having a varying cross-section and curved (col 4, lns 34-50). Kuts teaches a method of forming a ribbons from rubber threads (figs 1-3); and using a concave or hour glass roll 52 to gather threads, i.e., to crowd/bring together threads (col 4, lns 60-67; figs 7 and 11). Loubinoux et al and Kuts are combinable because they analogous with respect to using a roll/bar to center threads/yarns. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the concave or hour glass roller of Kuts for the bar of Loubinoux et al in order to ensure accurate gathering of the yarns of Loubinoux et al.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Loubinoux et al (USPN 6294036) in view of Angell, Jr. et al (USPN 5037284), Kuts (USPN 2954815), and Katsukura et al (USPN 6155306). It should be noted that Katsukura et al has been provided merely to illustrate the well-known idea of stripping static electricity from yarn before a step of processing. Loubinoux et al teach the basic claimed process including a process for manufacturing a composite tape based on reinforced fibers and thermoplastic organic material (col 2, ln 10-col 3, ln 40; figs 1-6); entraining yarns based on thermoplastic and reinforcing fibers and bring together the yarns in a parallel and touching manner in the form of a sheet (col 2, ln 10-col 3, ln 40;

figs 1-6); heating the sheet in a heating zone wherein the sheet is heated to a temperature reaching at least the melting point of the thermoplastic without reaching the softening temperature of the reinforcing fibers (col 2, lns 10-col 3, ln 40; figs 1-6); introducing the sheet against at least one rotating bar that shapes and centers the touching yarns of the sheet wherein the sheet is maintained at a temperature at which the thermoplastic is malleable and the touching yarns are brought together into a more touching state (col 2, lns 63-66; col 3, ln 66-col 4, ln 28)--as a note, the elimination of the corrugations indicate that the touching yarns were moved into a more touching state; and cooling the sheet in order to consolidate the yarns by freezing the thermoplastic and set the dimension and appearance of the sheet (col 5, ln 52-col 6, ln 10; figs 1-6). However, Loubinoux et al does not teach a rotating impregnation device including heated rollers that maintains the temperature of the sheet at a temperature at which the thermoplastic is malleable and distributes the thermoplastic uniformly and impregnates the fibers; a shaping and centering device including a roller in a shape of a hyperboloid; and using heated rollers having heating elements therein. In regard to a rotating impregnation device, Angell, Jr. et al teach a process for manufacturing resin-impregnated fiber tows (figs 1-2); using an impregnation station including kneader rolls and nip rolls positioned before a centering roll wherein the kneader and nip rolls cause uniform distribution of the resin and uniform impregnation of the fibers (col 4, lns 18-50; figs 1-2); and heating the kneader rolls and nip rolls to maintain the resin in a molten condition (col 4, lns 42-48; figs 1-6). Angell, Jr. et al also teach maintaining the resin portion of the impregnated tow in a molten condition by applying external heating

through radiant heaters or heated air, and enclosing the coating area inclusive of the kneader rolls, nip rolls, and coating rolls in order to maintain an elevated temperature environment (col 4, lns 42-48)--as a note, these teachings constitute using a rotating impregnation device including heated rollers. Loubinoux et al and Angell, Jr. et al are combinable because they are analogous with respect to forming a fiber-reinforced tape/sheet/tow. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to redesign the apparatus of Loubinoux et al to include the heated kneader rolls and nip rolls of Angell, Jr. et al between the heating zone and at least one rotating bar of Loubinoux et al in order to produce a fiber-reinforced sheet having greater strength and uniformity. In regard to a shaping and centering device including a roller in a shape of a hyperboloid, Loubinoux et al teach using a bar for centering having a varying cross-section and curved (col 4, lns 34-50). Kuts teaches a method of forming a ribbons from rubber threads (figs 1-3); and using a concave or hour glass roll 52 to gather threads, i.e., to crowd/bring together threads (col 4, lns 60-67; figs 7 and 11). Loubinoux et al and Kuts are combinable because they analogous with respect to using a roll/bar to center threads/yarns. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the concave or hour glass roller of Kuts for the bar of Loubinoux et al in order to ensure accurate gathering of the yarns of Loubinoux et al. Loubinoux et al also do not teach stripping static electricity from the yarns before passing the yarns through the heating zone. However, such is well-known in the molding art, as illustrated by Katsukura et al (col 12, lns 1-18), in order to prevent the embedment of contamination or eliminate the

risk of producing sparks. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to strip any static electricity from the yarns of Loubinoux et al before they are heated in order to ensure a safe molding process and produce a high quality contaminate-free, fiber-reinforced sheet.

5. Claims 20,21,25,26,27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loubinoux et al (USPN 6294036) in view of Angell, Jr. et al (USPN 5037284) and Kuts (USPN 2954815). In regard to claim 20, Loubinoux et al teach the basic claimed process including a process for manufacturing a composite tape based on reinforced fibers and thermoplastic organic material (col 2, ln 10-col 3, ln 40; figs 1-6); entraining yarns based on thermoplastic and reinforcing fibers and bring together the yarns in a parallel and touching manner in the form of a sheet (col 2, ln 10-col 3, ln 40; figs 1-6); heating the sheet in a heating zone wherein the sheet is heated to a temperature reaching at least the melting point of the thermoplastic without reaching the softening temperature of the reinforcing fibers (col 2, lns 10-col 3, ln 40; figs 1-6); introducing the sheet against at least one rotating bar that shapes and centers the touching yarns of the sheet wherein the sheet is maintained at a temperature at which the thermoplastic is malleable and the touching yarns are brought together into a more touching state (col 2, lns 63-66; col 3, ln 66-col 4, ln 28)--as a note, the elimination of the corrugations indicate that the touching yarns were moved into a more touching state; and cooling the sheet in order to consolidate the yarns by freezing (col 5, ln 52-col 6, ln 10; figs 1-6). However, Loubinoux et al does not teach a rotating impregnation

device including heated rollers that maintains the temperature of the sheet at a temperature at which the thermoplastic is malleable and distributes the thermoplastic uniformly and impregnates the fibers; a shaping and centering device including a roller in a shape of a hyperboloid ; and using heated rollers having heating elements therein. In regard to a rotating impregnation device, Angell, Jr. et al teach a process for manufacturing resin-impregnated fiber tows (figs 1-2); using an impregnation station including kneader rolls and nip rolls positioned before a centering roll wherein the kneader and nip rolls cause uniform distribution of the resin and uniform impregnation of the fibers (col 4, lns 18-50; figs 1-2); and heating the kneader rolls and nip rolls to maintain the resin in a molten condition (col 4, lns 42-48; figs 1-6). Angell, Jr. et al also teach maintaining the resin portion of the impregnated tow in a molten condition by applying external heating through radiant heaters or heated air, and enclosing the coating area inclusive of the kneader rolls, nip rolls, and coating rolls in order to maintain an elevated temperature environment (col 4, lns 42-48)--as a note, these teachings constitute using a rotating impregnation device including heated rollers. Loubinoux et al and Angell, Jr. et al are combinable because they are analogous with respect to forming a fiber-reinforced tape/sheet/tow. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to redesign the apparatus of Loubinoux et al to include the heated kneader rolls and nip rolls of Angell, Jr. et al between the heating zone and at least one rotating bar of Loubinoux et al in order to produce a fiber-reinforced sheet having greater strength and uniformity. In regard to a shaping and centering device including a roller in a shape of a hyperboloid,

Loubinoux et al teach using a bar for centering having a varying cross-section and curved (col 4, lns 34-50). Kuts teaches a method of forming a ribbons from rubber threads (figs 1-3); and using a concave or hour glass roll 52 to gather threads, i.e., to crowd/bring together threads (col 4, lns 60-67; figs 7 and 11). Loubinoux et al and Kuts are combinable because they analogous with respect to using a roll/bar to center threads/yarns. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the concave or hour glass roller of Kuts for the bar of Loubinoux et al in order to ensure accurate gathering of the yarns of Loubinoux et al. Loubinoux et al also teach passing the sheet through a heating zone before a cooling zone (col 9, ln 39-46; fig 6)--as a note, this constitutes the claimed step of passing the sheet through a heating zone after the sheet has passed through the rotating impregnating device. In regard to claims 21,25 and 26, Loubinoux et al teach providing yarns consisting of continuous glass filaments and continuous thermoplastic filaments which are co-mingled (col 2, ln 10-col 3, ln 40); winding the fiber-reinforced sheet on a mandrel (col 5, lns 30-33); and cooling the sheet in order to consolidate the yarns by freezing the thermoplastic and set the dimension and appearance of the sheet (col 5, ln 52-col 6, ln 10; figs 1-6). In regard to claims 27, Loubinoux et al do not teach cooling by immersing in a water bath. The use of a water bath as a cooling means is a mere obvious matter of choice dependent on the equipment availability and of little patentable consequence to the claimed process since it is not a manipulative feature or step of the claimed process. Further, water baths as cooling means are well-known in the molding art. Thus, it would have been obvious to one of ordinary skill in the art at

the time the invention was made to use a water bath in the process of Loubinoux et al in order to cool the tape of Loubinoux et al in an efficient manner. In regard to claim 28, such is well-known in the molding art in order to control tape/sheet thickness. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to drive the heated rollers of Loubinoux et al at a lower speed of rotation than a speed at which the sheet is traveling in order to control the thickness of the tape/sheet of Loubinoux et al.

6. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Loubinoux et al (USPN 6294036) in view of Angell, Jr. et al (USPN 5037284) and Kuts (USPN 2954815). Loubinoux et al teach the basic claimed process including a process for manufacturing a composite tape based on reinforced fibers and thermoplastic organic material (col 2, ln 10-col 3, ln 40; figs 1-6); entraining yarns based on thermoplastic and reinforcing fibers and bring together the yarns in a parallel and touching manner in the form of a sheet (col 2, ln 10-col 3, ln 40; figs 1-6); heating the sheet in a heating zone wherein the sheet is heated to a temperature reaching at least the melting point of the thermoplastic without reaching the softening temperature of the reinforcing fibers (col 2, lns 10-col 3, ln 40; figs 1-6); introducing the sheet against at least one rotating bar that shapes and centers the touching yarns of the sheet wherein the sheet is maintained at a temperature at which the thermoplastic is malleable and the touching yarns are brought together into a more touching state (col 2, lns 63-66; col 3, ln 66-col 4, ln 28)--as a note, the elimination of the corrugations indicate that the

touching yarns were moved into a more touching state; and cooling the sheet in order to consolidate the yarns by freezing (col 5, ln 52-col 6, ln 10; figs 1-6). However, Loubinoux et al does not teach a rotating impregnation device including heated rollers that maintains the temperature of the sheet at a temperature at which the thermoplastic is malleable and distributes the thermoplastic uniformly and impregnates the fibers; a shaping and centering device including a roller in a shape of a hyperboloid ; and using heated rollers having heating elements therein. In regard to a rotating impregnation device, Angell, Jr. et al teach a process for manufacturing resin-impregnated fiber tows (figs 1-2); using an impregnation station including kneader rolls and nip rolls positioned before a centering roll wherein the kneader and nip rolls cause uniform distribution of the resin and uniform impregnation of the fibers (col 4, lns 18-50; figs 1-2); and heating the kneader rolls and nip rolls to maintain the resin in a molten condition (col 4, lns 42-48; figs 1-6). Angell, Jr. et al also teach maintaining the resin portion of the impregnated tow in a molten condition by applying external heating through radiant heaters or heated air, and enclosing the coating area inclusive of the kneader rolls, nip rolls, and coating rolls in order to maintain an elevated temperature environment (col 4, lns 42-48)--as a note, these teachings constitute using a rotating impregnation device including heated rollers. Loubinoux et al and Angell, Jr. et al are combinable because they are analogous with respect to forming a fiber-reinforced tape/sheet/tow. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to redesign the apparatus of Loubinoux et al to include the heated kneader rolls and nip rolls of Angell, Jr. et al between the heating zone and at least one rotating bar of

Loubinoux et al in order to produce a fiber-reinforced sheet having greater strength and uniformity. In regard to a shaping and centering device including a roller in a shape of a hyperboloid, Loubinoux et al teach using a bar for centering having a varying cross-section and curved (col 4, lns 34-50). Kuts teaches a method of forming a ribbons from rubber threads (figs 1-3); and using a concave or hour glass roll 52 to gather threads, i.e., to crowd/bring together threads (col 4, lns 60-67; figs 7 and 11). Loubinoux et al and Kuts are combinable because they analogous with respect to using a roll/bar to center threads/yarns. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the concave or hour glass roller of Kuts for the bar of Loubinoux et al in order to ensure accurate gathering of the yarns of Loubinoux et al. Loubinoux et al also teach unreeling a continuous yarn of reinforcing filaments and thermoplastic filaments and regulating the tension of the yarns (col 2, ln 10-col 3, ln 40; col 8, lns 50-60; figs 1-6).

7. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Loubinoux et al (USPN 6294036) in view of Angell, Jr. et al (USPN 5037284), Kuts (USPN 2954815), and Katsukura et al (USPN 6155306). It should be noted that Katsukura et al has been provided merely to illustrate the well-known idea of stripping static electricity from yarn before a step of processing. Loubinoux et al teach the basic claimed process including a process for manufacturing a composite tape based on reinforced fibers and thermoplastic organic material (col 2, ln 10-col 3, ln 40; figs 1-6); entraining yarns based on thermoplastic and reinforcing fibers and bring together the

yarns in a parallel and touching manner in the form of a sheet (col 2, ln 10-col 3, ln 40; figs 1-6); heating the sheet in a heating zone wherein the sheet is heated to a temperature reaching at least the melting point of the thermoplastic without reaching the softening temperature of the reinforcing fibers (col 2, lns 10-col 3, ln 40; figs 1-6); introducing the sheet against at least one rotating bar that shapes and centers the touching yarns of the sheet wherein the sheet is maintained at a temperature at which the thermoplastic is malleable and the touching yarns are brought together into a more touching state (col 2, lns 63-66; col 3, ln 66-col 4, ln 28)--as a note, the elimination of the corrugations indicate that the touching yarns were moved into a more touching state; and cooling the sheet in order to consolidate the yarns by freezing (col 5, ln 52-col 6, ln 10; figs 1-6). However, Loubinoux et al does not teach a rotating impregnation device including heated rollers that maintains the temperature of the sheet at a temperature at which the thermoplastic is malleable and distributes the thermoplastic uniformly and impregnates the fibers; a shaping and centering device including a roller in a shape of a hyperboloid ; and using heated rollers having heating elements therein. In regard to a rotating impregnation device, Angell, Jr. et al teach a process for manufacturing resin-impregnated fiber tows (figs 1-2); using an impregnation station including kneader rolls and nip rolls positioned before a centering roll wherein the kneader and nip rolls cause uniform distribution of the resin and uniform impregnation of the fibers (col 4, lns 18-50; figs 1-2); and heating the kneader rolls and nip rolls to maintain the resin in a molten condition (col 4, lns 42-48; figs 1-6). Angell, Jr. et al also teach maintaining the resin portion of the impregnated tow in a molten condition by

applying external heating through radiant heaters or heated air, and enclosing the coating area inclusive of the kneader rolls, nip rolls, and coating rolls in order to maintain an elevated temperature environment (col 4, lns 42-48)--as a note, these teachings constitute using a rotating impregnation device including heated rollers. Loubinoux et al and Angell, Jr. et al are combinable because they are analogous with respect to forming a fiber-reinforced tape/sheet/tow. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to redesign the apparatus of Loubinoux et al to include the heated kneader rolls and nip rolls of Angell, Jr. et al between the heating zone and at least one rotating bar of Loubinoux et al in order to produce a fiber-reinforced sheet having greater strength and uniformity. In regard to a shaping and centering device including a roller in a shape of a hyperboloid, Loubinoux et al teach using a bar for centering having a varying cross-section and curved (col 4, lns 34-50). Kuts teaches a method of forming a ribbons from rubber threads (figs 1-3); and using a concave or hour glass roll 52 to gather threads, i.e., to crowd/bring together threads (col 4, lns 60-67; figs 7 and 11). Loubinoux et al and Kuts are combinable because they analogous with respect to using a roll/bar to center threads/yarns. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the concave or hour glass roller of Kuts for the bar of Loubinoux et al in order to ensure accurate gathering of the yarns of Loubinoux et al. Loubinoux et al do not teach stripping static electricity from the yarns before passing the yarns through the heating zone. Such is well-known in the molding art, as illustrated by Katsukura et al (col 12, lns 1-18), in order to prevent the

embedment of contamination or eliminate the risk of producing sparks. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to strip any static electricity from the yarns of Loubinoux et al before they are heated in order to ensure a safe molding process and produce a high quality contaminate-free, fiber-reinforced sheet.

8. Applicant's arguments with respect to claims 1,2,6,20,21,25,26,27,28,29 and 30 have been considered but are moot in view of the new ground(s) of rejection. In regard to applicant's arguments concerning claims 3 and 22, such are misplaced because Loubinoux et al clearly teach the claimed limitation of regulating the tension of the yarn. In regard to claims 4 and 23, the above rejections clearly illustrate the well-known idea of removing/stripping static electricity from yarn before a step of processing.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDMUND H. LEE whose telephone number is 571.272.1204. The examiner can normally be reached on MONDAY-THURSDAY FROM 9AM-4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Colaianni can be reached on 571.272.1196. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

EDMUND H. LEE
Primary Examiner
Art Unit 1732

EHL

12/27/04.